INDIANA
Epidemiology
NEWSLETTER

Indiana State Department of Health

Epidemiology Resource Center
2 North Meridian Street, 3-D
Indianapolis, IN 46204
317/233-7416

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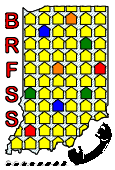
Vol. VIII, No. 9

Streptococcus pneumoniae Surveillance in Indiana

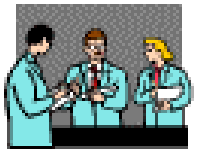
Wayne Staggs, MS
ISDH Epidemiology Resource Center

Pneumococcal infection is a serious disease caused by the bacteria *Streptococcus pneumoniae*. It is the leading cause of bacterial meningitis in children and causes approximately 3,000 cases of meningitis and 50,000 cases of bacteremia in all age groups[1].

Following the recommendation of the Indiana State Department of Health (ISDH) Emerging Infectious Disease Committee, voluntary surveillance of invasive pneumococcal disease began in Indiana during the summer of 1998. Required reporting will begin with the adoption of the new Communicable Disease Reporting Rule, which will become effective later this year.



Drug Resistant *S. pneumoniae* (DRSP) emerged as a major public health issue in the 1990s. In addition, results from the 1998 Behavioral Risk Factor Surveillance System Report indicates that only 47% of Indiana residents over the age of 65 have had at least one dose of pneumococcal vaccine. And as the Emerging Infectious Disease Committee was meeting in 1997-98 it was anticipated that a conjugate pneumococcal vaccine would soon be licensed for infants, which did occur earlier this year. As a result of these and other issues, the ISDH initiated the voluntary reporting system in 1998. The primary objective were to develop a surveillance system capable of: 1) monitoring rates of invasive pneumococcal disease and invasive DRSP, 2) evaluating the effectiveness of immunization policies and programs in the state, and 3) contributing information to influence appropriate antibiotic use. As a complement to item 1, a pre-conjugate vaccine incidence baseline would be established if disease surveillance were established prior to availability of pneumococcal conjugate vaccine for infants.

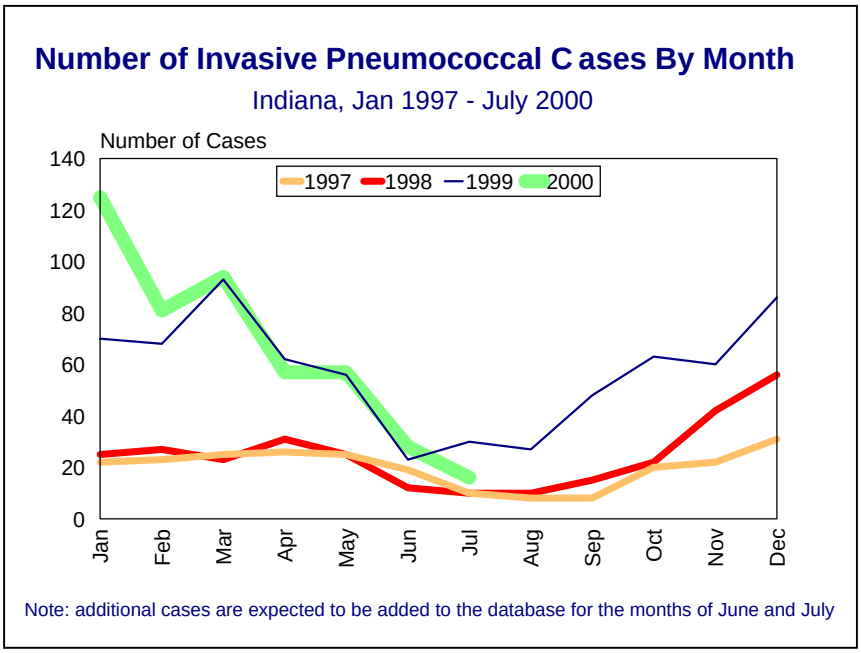


Laboratories are asked to submit reports of invasive pneumococcal disease and the sensitivity report of each isolate to the ISDH. Individual case information is then obtained by local health department and infection control nurses on an ISDH provided data collection form. In 1997, 200 reports were received, increasing to 312 in 1998 following the midyear request for voluntary reporting. In 1999, 691 unduplicated cases (persons who were reported as having at least one isolate from a sterile site) were reported to the system. Fifty-four cases had *S. pneumoniae* isolated from two separate sterile sites. During the first seven months of 2000, 455 unduplicated cases were reported with twenty of those individuals having isolates from two separate sites. The following report describes the cases and isolates from both the 1999 and 2000 dataset.

Epidemiology of Cases

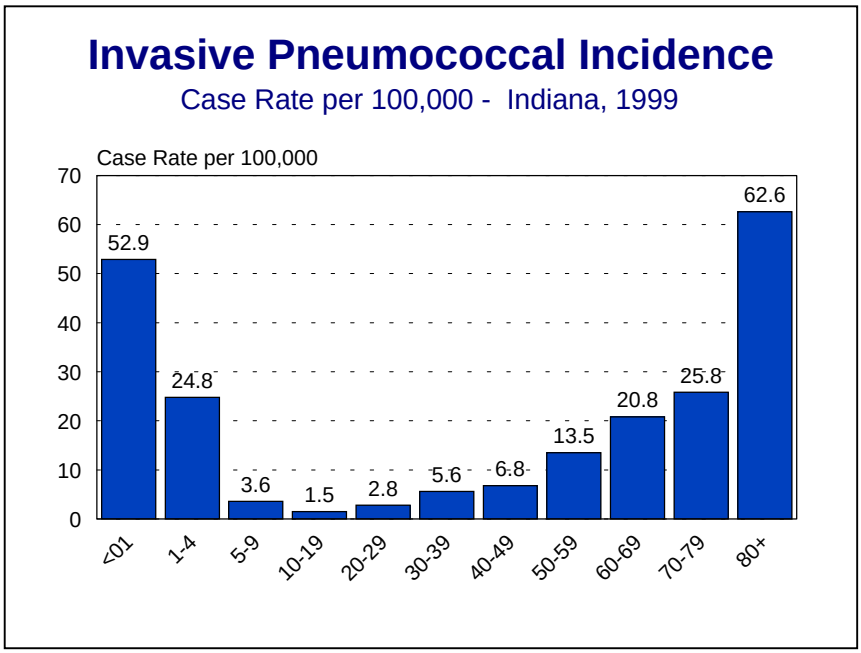
As can be seen in Figure 1, pneumococcal disease has a seasonal pattern of high incidence in the winter and early spring months. Forty-six percent of the cases occurring in 1999 had positive cultures reported during the four-month period of December through March.

Figure 1.



Pneumococcal disease is a disease of the very young and the elderly. Case rates are high for children under five years of age, are low (less than 5/100,000) for age groups 10-39, and then gradually increase to over 60/100,000 for those 80 years and older.

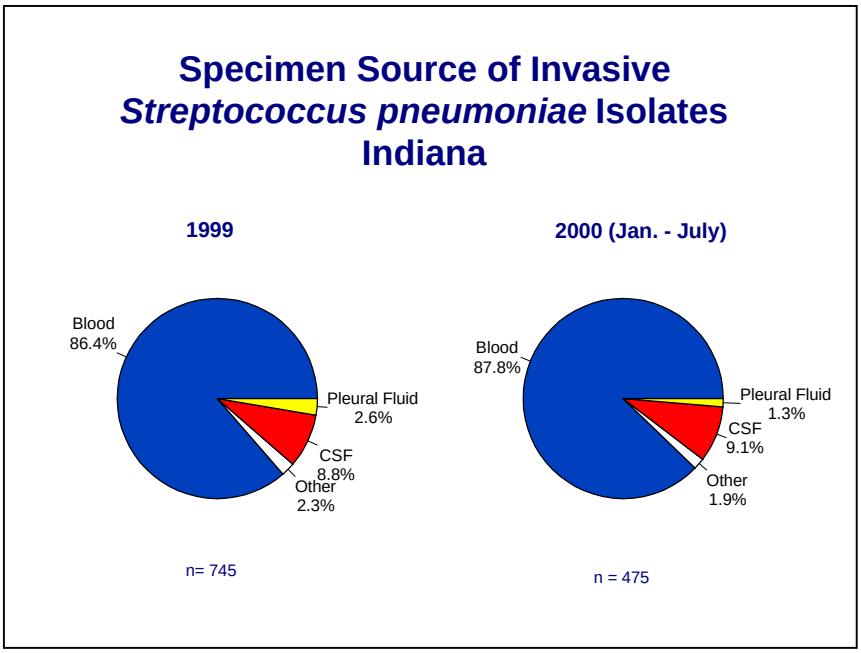
Figure 2.



Specimen Source

Isolates were obtained from nine different sterile sites in 1999-2000. Figure 3 shows the percentage from each site based on the 745 sterile sites from which *S. pneumoniae* was isolated in 1999 and the 475 sites in 2000.

Figure 3.



Drug Resistance

Drug Resistance has become an emerging world problem in the treatment of *S. pneumoniae* invasive disease. In the U.S., drug resistance has increased substantially in the last 15 years. Investigations by CDC and others indicate that resistance varies regionally and as many as 30% of isolates are resistant to penicillin [2,3]. Penicillin sensitivity information was received on 86% of 1999 Indiana cases and 88% of cases received so far in 2000. Of those cases with sensitivity data available, intermediate or high level resistance to penicillin was found in 27.4% of cases in 1999 and 31.4% in the year 2000. In persons less than six years of age, the percent increases to 37.4% in 1999 and 39.2% in 2000. Table 1 depicts the resistance levels of isolates found in blood and cerebral spinal fluid in all ages and children less than six years of age in 1999 and 2000 (Jan-July).

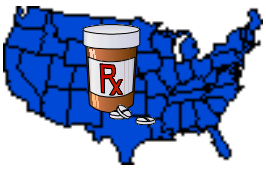


Table 1.
Number and percent of penicillin resistance in individual cases
Indiana, 1999 and 2000 through July.

	Sensitive		Intermediate Level Resistance		High Level Resistance		Total Number of Cases	
	1999	2000*	1999	2000*	1999	2000*	1999	2000*
Blood (all ages)	403 (72.6%)	262 (70.1%)	88 (15.9%)	52 (13.9%)	64 (11.5%)	60 (16.0%)	555	374
Cerebral Spinal Fluid (all ages)	37 68.5%)	17 (56.7%)	13 (24.1%)	7 (23.3%)	4 (7.4%)	6 (20.0%)	54	30
Blood (<6 years)	75 (62.5%)	43 (65.1%)	25 (20.8%)	12 (18.2%)	20 (16.7%)	11 (16.7%)	120	66
Cerebral Spinal Fluid (<6 years)	11 (78.6%)	4 (36.4%)	2 (14.3%)	4 (36.4%)	1 (7.1%)	3 (27.3%)	14	11

* January – July, 2000

To better understand the rate of resistance in Indiana counties, Table 2 lists the number of isolates and their sensitivity by county of residence of the patient.

Table 2.
Number of cases with sensitivity reported and percent sensitivity level
Indiana, 1999 and 2000 through July.

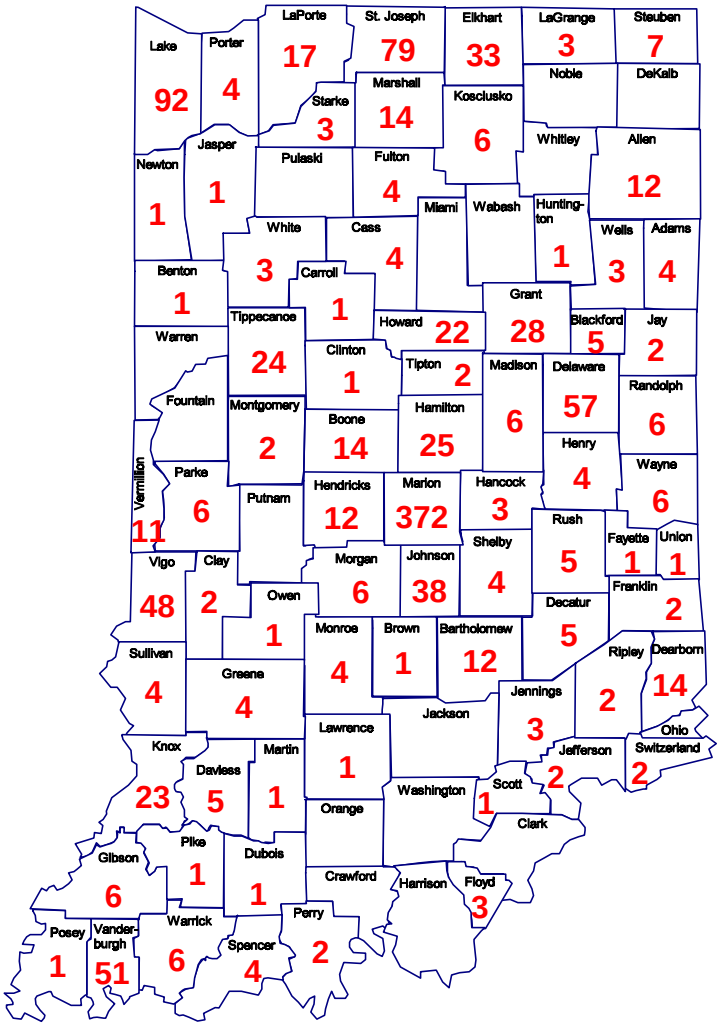
County	Intermediate Level Resistance	High Level Resistance	Sensitive	Total
Adams	0	0	1	1
Allen	1	2	1	4
Bartholomew	2	1	2	5
Benton	0	0	1	1
Blackford	0	0	3	3
Boone	0	2	8	10
Brown	0	0	1	1
Cass	0	1	2	3
Clay	0	0	1	1
Clinton	0	0	1	1
Dearborn	1	0	7	8
Decatur	1	1	1	3
Delaware	6	11	16	33
Dubois	1	0	0	1
Elkhart	0	0	7	7
Floyd	0	2	0	2
Fulton	2	1	1	4
Gibson	0	0	4	4

County	Intermediate Level Resistance	High Level Resistance	Sensitive	Total
Grant	4	2	12	18
Greene	0	0	1	1
Hamilton	1	3	11	15
Hancock	0	0	1	1
Hendricks	1	2	6	9
Henry	0	1	1	2
Howard	4	2	8	14
Jasper	0	0	1	1
Jefferson	0	0	1	1
Jennings	1	0	0	1
Johnson	3	5	3	11
Knox	0	3	7	10
Kosciusko	0	1	0	1
Lagrange	0	0	2	2
Lake	9	5	32	46
LaPorte	1	2	8	11
Lawrence	0	1	0	1
Madison	1	0	2	3
Marion	32	8	165	205
Marshall	0	0	7	7
Martin	1	0	0	1
Montgomery	0	0	1	1
Morgan	1	0	3	4
Newton	0	0	1	1
Parke	3	0	0	3
Perry	0	1	0	1
Pike	0	0	1	1
Porter	0	0	1	1
Randolph	1	1	2	4
Ripley	0	0	2	2
Rush	0	0	3	3
Shelby	0	0	2	2
Spencer	0	0	2	2
St. Joseph	2	2	16	20
Starke	0	0	1	1
Steuben	0	0	4	4
Sullivan	0	1	1	2
Switzerland	0	0	1	1
Tippecanoe	1	1	8	10
Tipton	0	0	1	1
Union	0	0	1	1
Vanderburgh	5	2	14	21
Vermillion	3	1	3	7
Vigo	4	1	22	27
Warrick	1	0	5	6
Wayne	1	0	2	3
Wells	0	0	1	1
White	0	0	2	2
Total	94	66	425	585

Completeness of Data in the Surveillance System

Receipt of cases from the entire state is important to establish the extent of pneumococcal disease, as well as being able to determine local and regional differences in drug resistance. As can be seen in Figure 4, numerous reports have been received from many counties, while reports have not been as forthcoming from other counties.

Figure 4. Total number of invasive pneumococcal cases by county Indiana, 1999 and 2000 (Jan - July).



Completeness and accuracy of data is critical for a functional and useful surveillance system. Feedback from such data as contained in this report is only as good as the data being supplied to the system. Table 3 depicts the state rates for completeness of data for 1999 surveillance based on the 691 individual cases in 1999 and the 455 in 2000.

Table 3.
Percent of Cases with Complete Data Available

Category	Percent of Cases with Complete Data 1999	Percent of Cases with Complete Data 2000
Age	96%	100%
Race	84%	81%
Sensitivity Profile	86%	88%
Vaccine History	30%	40%
Underlying Medical Condition	35%	65%

As can be seen by the data contained in Table 3, groups and individuals supplying information to the surveillance system are doing well with age, race, and sensitivity profiles. Although there are increases from 1999 to 2000 for the percentage of cases with vaccine history and underlying medical condition data, there is need for continued improvement. Increasing the rate of data completeness for vaccine history and underlying medical conditions is a goal of the ISDH. Completeness of data is being monitored by health jurisdiction. For specific data pertaining to cases in your jurisdiction, please contact Wayne Staggs by calling (317) 233-7112, or e-mail at wstaggs@isdh.state.in.us).

ISDH staff would like to thank those individuals, laboratories, and agencies who have helped support this voluntary reporting system. We look forward to refining and enhancing this system in the future.

References

[1]Centers for Disease Control and Prevention, Recommendations of the Advisory Committee on Immunization Practices (ACIP): Prevention of Pneumococcal Disease. MMWR 1997;46(No. RR-8)
[2]Duchin JS, Breiman RF, Diamond A, et al. High prevalence of multi-drug resistant *Streptococcus pneumoniae* among children in a rural Kentucky community. Pediatric Disease Journal 1995;14:745-50
[3]CDC. Prevalence of penicillin resistant *Streptococcus pneumoniae* - Connecticut, 1992-93. MMWR 1194;43:216-17, 223.

Conference Highlights New Trends in Emerging Infectious Diseases

Robert Teclaw, DVM, MPH, PhD
Indiana State Epidemiologist

The Centers for Disease Control and Prevention (CDC) and several other organizations sponsored the International Conference on Emerging Infectious Diseases 2000 last July in Atlanta, Georgia. In addition to numerous interesting presentations about particular infectious diseases, several general themes "emerged" from the conference.

The distinction between infectious and chronic diseases continues to blur. Many chronic diseases that until recently were attributed to environmental, genetic, and lifestyle factors are now believed to have infectious causes. *Helicobacter pylori* is considered to be an important cause of duodenal and gastric ulcers. *Chlamydia pneumoniae* infection is associated with atherosclerosis, and there is evidence that *Mycoplasma pneumoniae* infection contributes to the development of asthma. Chronic *Borrelia burgdorferi* (Lyme disease) infection produces debilitating arthritis.

The list of infectious agents that are part of the causal chain of cancer continues to grow. Persons infected with *H. pylori* have a higher rate of stomach cancer than people not infected. Over 80% of liver cancers can be attributed to infections with hepatitis B and C viruses. Human papilloma viruses are responsible for a large number of cervical cancer cases. Several animal cancers have infectious causes, and there is good reason to believe that viruses and bacteria will be found to cause additional types of human cancer as well.

The presentations at the International Conference on emerging Infectious Diseases 2000 made clear that most of the emerging infections of humans are zoonoses. Humans have increasing contact with both domestic and wild animals. Suburban and rural developments encroach into animal habitats, and previously isolated regions around the world are being settled. Add to this the ability to travel from just about any place on earth to another in less than 24 hours, and the opportunity for cross-species transmission grows. Examples of emerging zoonoses include Lyme disease, raccoon-strain rabies, hantavirus, ehrlichiosis, West Nile encephalitis, Nipah virus, Hendra virus, new variant Creutzfeldt-Jakob disease, Lassa fever, and Ebola fever. Even HIV was probably acquired by humans from animals. The zoonotic disease with perhaps the greatest potential for damage worldwide is influenza. In 1918, an influenza virus that is thought to have spread from swine to humans killed millions of people. That horror could repeat itself today.

It is a general epidemiologic principal that diseases have multiple, interrelated causes. Rather than speaking of the cause of disease X, it is more conceptually useful to think of causal webs. This is no less true for infectious than for chronic diseases. Many presentations at the conference reinforced this view of causality. One of the most intriguing parts of causal webs is the effect of host genetics on disease incidence. This is a relatively new area of epidemiologic research that has been made possible by advances in genetic technology, including the Human Genome Project (image provided by DOE Human Genome Program http://www.ornl.gov/hgmis). An example of genetic determination of disease incidence is the resistance of certain people to HIV infection. Because they lack the gene that produces an HIV receptor protein, they cannot become infected.

What do these trends mean for public health practice? The number of pathogenic organisms we need to address is increasing. This means that our surveillance systems should be robust enough to detect the occurrence of unusual diseases and common diseases in unusual patterns. If disease incidence is unknown, the public cannot be protected. For many of us, this will entail educating ourselves and others about emerging infectious diseases, fine-tuning surveillance systems, maintaining a high index of suspicion for uncommon pathogens, and investigating infectious disease cases promptly.

Lung Cancer Incidence in Indiana

Roland Gamache, PhD, MBA
ISDH Epidemiology Resource Center

Cancer is the second leading cause of death in Indiana, and lung cancer is the cause for the largest number of deaths in the cancer classification. During 1997, Indiana had a total of 3,736 deaths from lung cancer with an age-adjusted death rate of 54.0 deaths/100,000. This rate compares to the 1997 US age-adjusted rate of 48.4 deaths/100,000. Based on 1997 national data, Indiana ranked thirteenth highest for lung cancer deaths in the nation.

The lung cancer rate in Indiana has remained fairly constant over the last five years (Figure 1). This observation is different when the death rates are compared for gender. The age-adjusted death rate from lung cancer of males has decreased over the last five years, while the death rate from lung cancer has increased for females (Figure 2).

Figure 1.

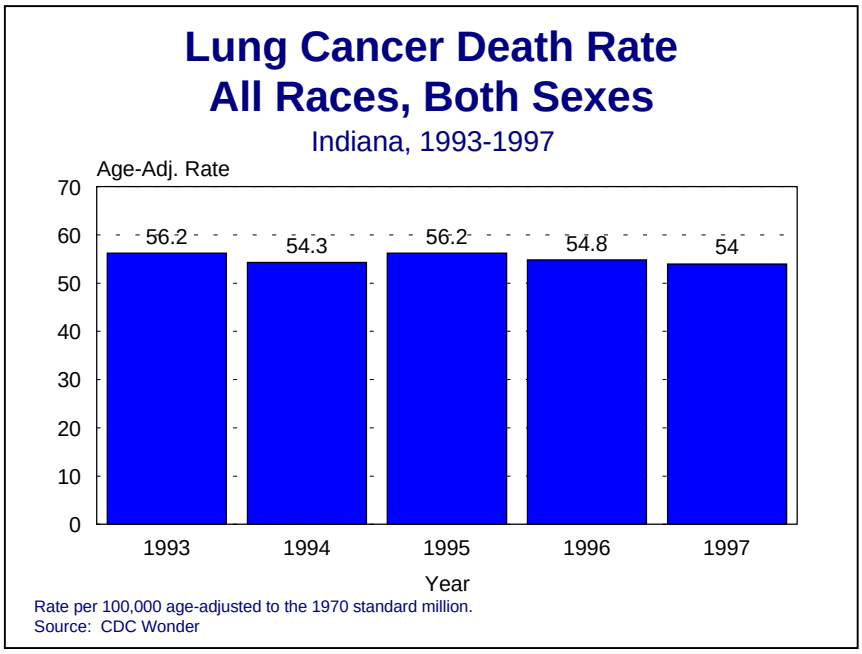
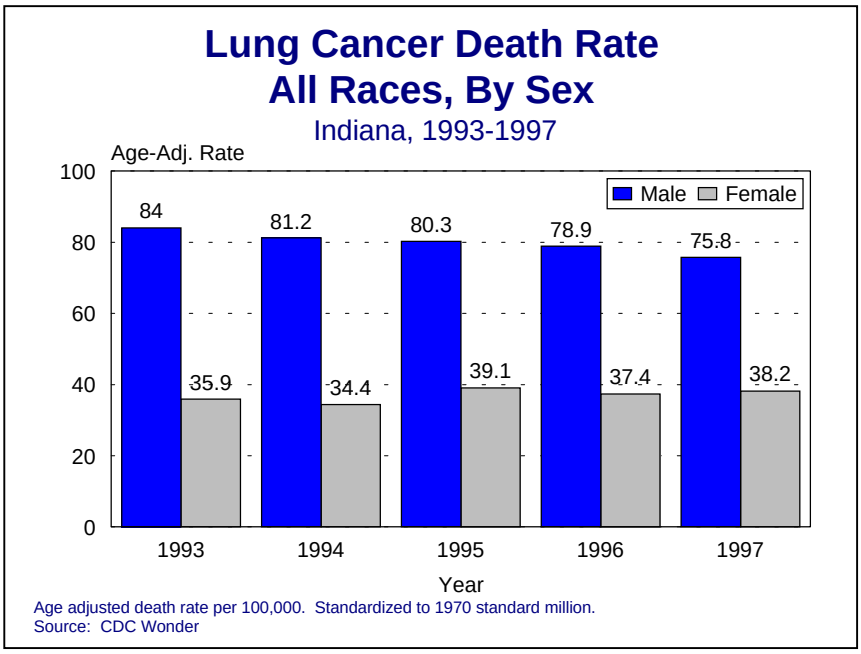


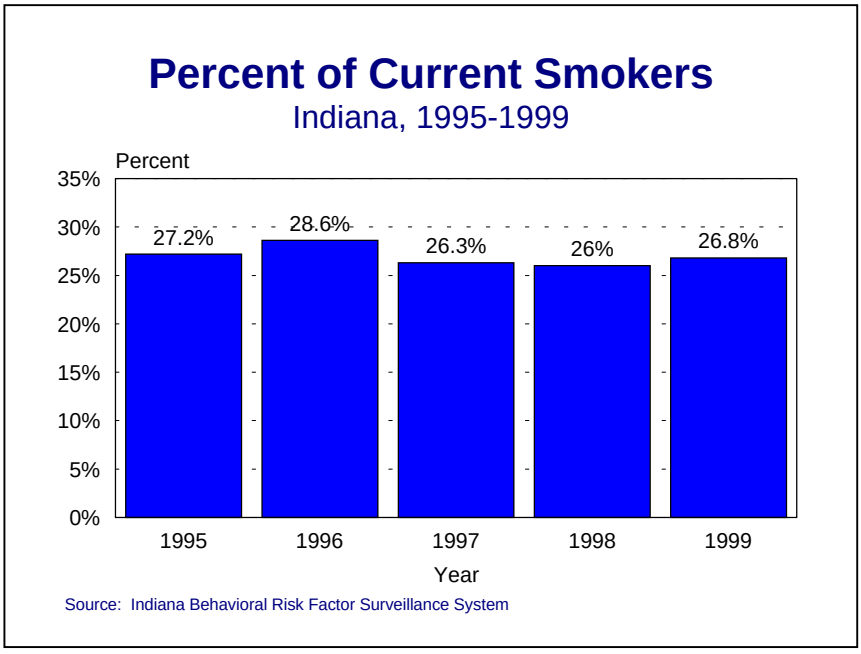
Figure 2.



More males die from lung cancer each year than females: 2,236 lung cancer deaths for males compared with 1,500 deaths for females. However, as a larger proportion of females begin smoking, the difference in death rates from lung cancer between the genders becomes less.

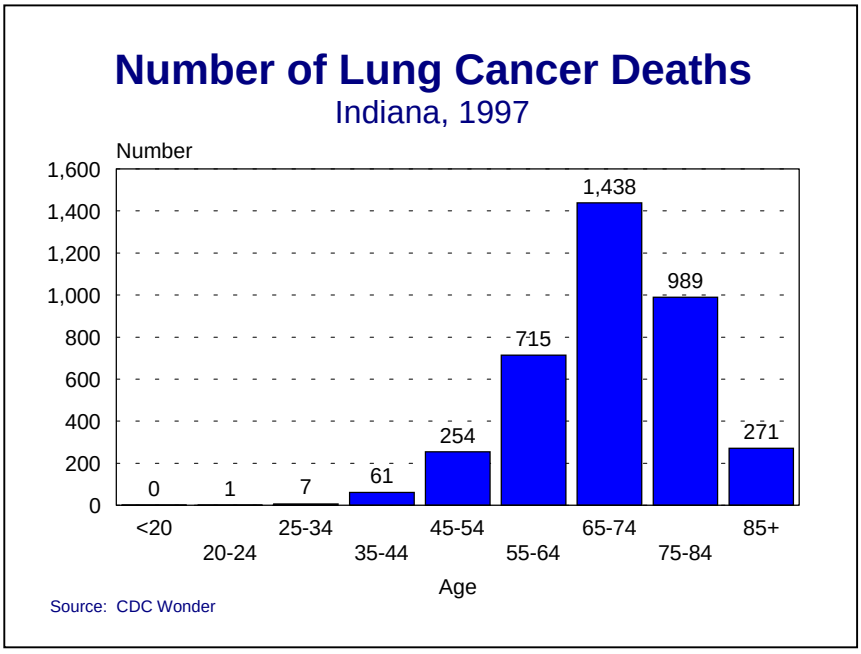
The major risk factor for developing lung cancer is tobacco smoking. Some sources suggest that over 80% of lung cancers are caused by smoking. In fact, smoking in combination with other risk factors such as exposure to Radon or asbestos increases the risk of developing lung cancer even more. Figure 3 presents the Indiana smoking prevalence for the state. The greatest changes in the rates of lung cancer deaths can be explained by an increase or decrease in the proportion of smokers.

Figure 3.



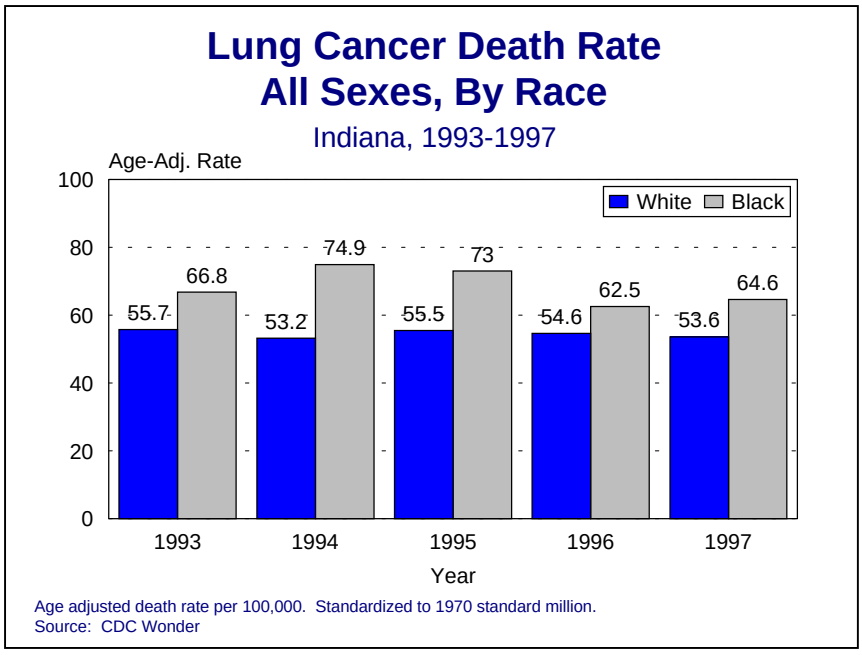
Over the age of 45, the number of lung cancer deaths increases dramatically (Figure 4). The deaths from lung cancer peak during the ten years of the age group 64 to 74. Although the number of deaths from lung cancer appears to drop dramatically over the age of 85, the death rate for this age group is just slightly lower than the 64-74 age group.

Figure 4.



There is also a difference between the lung cancer death rates for the white and black population (Figure 5). The black age-adjusted rate of mortality from lung cancer is on average 20% higher than the white death rate.

Figure 5.



Conferences and Seminars

Fall Immunization Award/Educational Conferences Coming Up in October

October 25
Jasper Holiday Inn
Jasper, Indiana

Welcome:
Dr. Thomas Gootee
Health Officer
Dubois County Health Dept.

Guest Speaker:
Dr. Richard Clover
Dept. of Family & Community Medicine

October 26
Valle Vista Golf Club
Greenwood, Indiana

Welcome:
Dr. Richard Feldman
IN State Health Commissioner

Guest Speaker:
Dr. John Gaebler
Assoc. Prof., Pediatrics
Indiana Univ./Purdue Univ.

October 27
South Bend City Centre Holiday Inn
South Bend, Indiana

Welcome:
Patricia Paszkiet, RN
Director of Nursing
St. Joseph County Health Dept.

Guest Speaker:
Phillip Hosbach IV
Aventis Pasteur

For more information, please call Pat Schwer at the Indiana State Department of Health at (317) 233-7503.
(See Registration Form on the next page.)

Educational Opportunity for Local Health Departments coming up in September:

Satellite Conference on Bioterrorism

Knowledge about the extensive biological weapons programs in other countries and numerous recent bioterrorism threats have increased the concern regarding the medical management of biological agent casualties on the battlefield overseas and domestically, including Indiana. As a result, world-reknowned experts from the Centers for Disease Control and Prevention (CDC) and the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) are co-sponsoring a satellite-based course on Bioterrorism.

During this 3-day, interactive satellite broadcast participants will learn what the military and civilian medical and public health response should be. Proficiency will be acquired in recognizing that a biological attack has occurred, activating the appropriate agencies and personnel to investigate the event, treating casualties, and preventing the spread of the agent. Public health professionals such as local health officers, administrators, environmental health specialists, epidemiologists, and public health nurses involved in disease surveillance and prevention at the local health department level.

Course Registration & Other Information

The satellite broadcast will air:

September 26, 27, & 28
12:30-4:30 pm Eastern Daylight Time
OR
11:30-3:30 pm Eastern Standard Time

(SPACE IS LIMITED.) All sessions will be in the Commissioner's conference room (not the Board room):

Indiana State Department of Health
2 North Meridian Street
Indianapolis, Indiana

Local health department personnel are invited and encouraged to take part in the course. The course is free.

Indiana State Department of Health

Fall Immunization Award/Educational Conferences

Registration Form

Please check the one site location that you expect to attend. There is no charge for attending the conference and awards luncheon, therefore, a limited number of seats are available on a "First come, first served" reservation only basis.

___October 25 – Jasper, Holiday Inn

Welcome: Thomas Gootee, M.D. Health Officer, Dubois County Health Department
Keynote Speaker: Richard Clover, M.D., Chairman of Family and Community Medicine, Louisville, Kentucky, will speak on the mechanics of the ACIP.

___October 26 – Greenwood, Valle Vista Golf/Conf.Center

Welcome: Richard D. Feldman, M.D., State Health Commissioner
Keynote speaker: John W. Gaebler, M.D.– I.U. School of Medicine, speaks on Pediatric Infectious disease and immunization.

___October 27 - South Bend, City Centre Holiday Inn

Welcome: Patricia Paszkiet, R.N., St. Joseph County Health Department
Keynote speaker: Philip Hosbach IV, Executive Director, Public Business and Immunization Policy, Aventis Pasteur.

Special session on Prevnar by Dr. Goliak from Wyeth-Ayerst, at each location

PLEASE CHECK THE AM AND PM BREAKOUT SESSION(S) PREFERRED:

Morning Breakout choices at each location:

A1___"What Gets Measured, Gets Done": CASA Results
A2 ___Communicable Disease Rule: Changes/Emphasis of Vaccine Preventable Disease
A3___ Current Status of the Immunization Registries

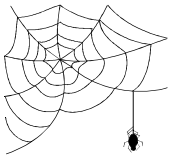
Afternoon Breakout choices at each location

B1___Raising Indiana's Immunization Rates: "Interventions That Work"
B2___Perinatal Hep B Program: "A Revitalized Approach"
B3___Vaccination Administration Techniques

Name (One name per form) _____
*Office:*_____
Physician ___ Nurse ___ Health Educator ___ Other_____
Telephone:_____Fax:_____

MAIL TO: Indiana State Department of Health
Attn: Pat Schwer 6A
2 North Meridian Street
Indianapolis, IN 46204

OR FAX TO: (317) 233-7805
For Information call: (765) 215-5885



Wonderful Wide Web Sites

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.state.in.us/isdh/ (under Data and Statistics)

Indiana Cancer Incidence Report (1990, 95)

Indiana Cancer Mortality Report (1990-1994)

Indiana Health Behavior Risk Factors (1995-96, 97, 98)

Indiana Hospital Consumer Guide (1996)

Indiana Marriage Report (1995, 96, 97)

Indiana Mortality Report (1995, 97)

Indiana Natality Report (1995, 96, 97)

Indiana Natality/Induced Termination of Pregnancy/Marriage Report (1998)

Indiana Report of Diseases of Public Health Interest (1997, 98)

The following site allows access to the web page for any state health department in the United States:

http://www.polsci.wvu.edu/grad/klase/STATEHEALTH/sthlth.html

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in August		Cumulative Cases Reported through August	
	1999	2000	1999	2000
Campylobacteriosis	82	126	343	386
E. coli O157:H7	21	28	49	67
Giardiasis	104	80	359	318
Hepatitis A	9	18	73	53
Hepatitis B	5	6	32	36
Legionellosis	3	4	26	26
Lyme Disease	5	7	14	19
Meningococcal, invasive	12	0	43	33
Pertussis	20	24	49	62
Rocky Mountain Spotted Fever	1	1	9	2
Salmonellosis	95	125	337	415
Shigellosis	73	244	175	1,135
Tuberculosis	16	9	97	86
Animal Rabies	0	0	0	0

For information on reporting of communicable diseases in Indiana, call the *ISDH Communicable Disease Division* at (317) 233-7665.

Indiana
Epidemiology
Newsletter

The *Indiana Epidemiology Newsletter* is published by the Indiana State Department of Health to provide epidemiologic information to Indiana health professionals and to the public health community.